REPORT 3 FROM A REAPPRAISAL OF THE FOREST SITUATION

SD143
A35
no.3

THE MANAGEMENT STATUS OF FOREST LANDS IN THE UNITED STATES

U. S. Department of Agriculture - Forest Service

1946

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No. 1 Gaging the Timber Resource of the United States

No. 2 Potential Requirements for Timber Products in the United States

No. 3 The Management Status of Forest Lands in the United States

No. 4 Wood Waste in the United States

No. 5 Protection Against Forest Insects and Diseases in the United States

Foreword

During 1945 and 1946 the Forest Service has been making a reappraisal of the Nation's forest situation. This undertaking, carried out under the general direction of R. E. Marsh, brings up to date previous analyses of a similar nature.

This report covers one aspect of the forest situation. Others will deal with different aspects, and with the situation as a whole.

The large amount of field work which provided the basic information for this report was carried out by the regional offices of the Forest Service with the cooperation of State foresters and other public and private agencies concerned with the management of forest lands.

Preliminary assembly and analysis of the field survey information was done by H. B. Wales and W. R. Hine. The report was prepared by V. L. Harper and James C. Rettie.

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Washington, D. C.

Issued December 1946
Slightly revised July 1947

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THE MANAGEMENT STATUS OF FOREST LANDS IN THE UNITED STATES

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Introduction

Any comprehensive appraisal of the forest situation must include critical scrutiny of the quality of management that is being applied to the commercial forest lands of the country. To obtain basic data on the status of management, the Forest Service made a field survey early in 1945. The survey was specifically designed to supply information on the character of recent timber cutting practices and of fire control measures, and on the extent to which the larger forest properties, both public and private, are being managed on a sustained-yield basis.

Field work was done by personnel of the Forest Service with assistance by the staffs of State foresters and of other public and private agencies concerned with the management of forest lands. It involved complete coverage of publicly owned commercial forest lands and of privately owned commercial forest lands in holdings of 50,000 acres and over. The remainder of the privately owned commercial forest land was covered by sampling methods. Some 42,000 small and medium-sized holdings, distributed to give a fair representation as to size of property and region, were examined.

Details of the criteria and methods of the survey are given in the sections of this report devoted to timber cutting practice, fire protection, and sustained yield. These and other sections include summary compilations of the data obtained and brief discussions of the forest-management situation.

Timber Cutting Practices

Each man assigned to the field survey was provided with a cutting-practice guide designed to fit each major forest type in the area he was to cover. This guide set up a median standard of cutting practice for the type. It served as the bench mark for five cutting-practice ratings applicable in the evaluation of the cutting found on each property. Two ratings provided for recognition of practices which were better than that set up in the guide and two for practices which were inferior. Fair cutting is the median rating which corresponds, as nearly as can be judged, with the practice outlined in the guide. The five ratings defined in briefest form are as follows:

1. High-order cutting requires the best types of harvest cutting, which will build up and maintain quality and quantity yields consistent with the full productive capacity of the land. Wherever needed, it requires cultural practices, such as planting, timber-stand-improvement cuttings, thinnings, and control of grazing. 1/

2. Good cutting requires that the cut be made in accordance with the demands of good silviculture and that the land be left in possession of desirable species in condition for vigorous growth in the immediate future. It is substantially better than fair cutting and contains some of the elements of high-order cutting.

3. Fair cutting marks the beginning of cutting practices which will maintain on the land any reasonable stock of growing timber in species that are desirable and marketable.

4. Poor cutting leaves the land with a limited means for natural reproduction, often in the form of remnant seed trees on broad areas otherwise clear-cut of all merchantable timber. In second-growth forests, poor cutting robs the stand of minimum-size merchantable trees in stages of rapid growth. Such cutting often causes deterioration of species with consequent reduction in both quality and quantity of forest growth.

5. Destructive cutting leaves the land without timber values and without means for natural reproduction.

One of these ratings was given to each operating forest property covered in the survey. Occasionally a tract of land was found for which no rating could be assigned because fire, hurricane, or some other agent had effectively obscured the cutting evidence. Some other properties such as private estates and hunting areas showed no signs of recent cutting. There were also the remote areas of the national forests that still await access roads to open them for logging. All tracts of the types just mentioned were classified as nonoperating lands. They include about 13 percent of the total commercial forest acreage. 2/

1/ High-order cutting implies a very intensive silviculture as yet only in the initial stages of development in this country.

2/ More information on the areas and ownership of nonoperating lands will be found in the section "Management Status of Commercial Forest Lands."

For the operating properties, the most recent cutting determined the cutting-practice rating. Usually it had occurred in the period 1941 to 1945, but occasionally the rating was necessarily based on earlier cutting. The national forests and other large public and private holdings were rated by working circles.

After each forest land parcel (property or working circle) had been given a cutting-practice rating, the next step was to record some measurement of the forest land parcel that would permit proper summarization of the results--to arrive at some percentage figures for each region and each class of ownership that would show what proportion of the cutting was "high order," what proportion was "good," and so on. There appeared to be at least three ways of getting these percents.

1. The percents could be figured on the basis of the quantity of timber cut in a specified period of time. If, for example, 10 million board feet were cut in 1944 from the parcels rated "good" out of a total of 100 million cut from all parcels within a region, it could be said that 10 percent of the cutting was "good."

2. The percents could be figured on the basis of the acreage of forest land cut over within a specified period of time. If, for example, 2 thousand acres were cut over in 1944 on the parcels rated " good," out of a total of 10 thousand acres cut over on all parcels, it could be said that 20 percent of the cutting was "good."

3. The percents could be figured on the basis of the acreage of commercial forest land in the operating parcels. If, for example, the total acreage of parcels rated "good" was 15 thousand acres, out of a grand total of 100 thousand acres in all operating parcels within a region, it could be said that 15 percent of the cutting was "good."

Observe that in these three examples the results show different percents of "good" cutting for each of the three methods. So it would be with the actual results of the management survey.

The first method, based on volume of timber cut, would give the lowest percents for the best cutting (and the highest percents for the poorest). It thus tends to emphasize the gloomy aspect of the cutting-practice situation. This follows from the fact that good cutting generally is partial and hence light cutting, while poor cutting is likely to be broad-scale clear cutting and hence heavy cutting. This would boost the percent attributed to poor practices.

The second method, based on acreage cut over, would give the highest percents for the best cutting (and the lowest percents for the poorest cutting). It would tend to emphasize the brighter aspect of the cutting-practice situation. This is because good cutting generally is lighter cutting spread over a comparatively large acreage. Poor cutting, being heavy cutting, is more concentrated.

The third method, based on total acreage in the operating parcel, would give results that are intermediate between the other two. Compared with them it tends to emphasize neither the best cutting nor the poorest. It occupies a middle ground. Because of its median character, and because acreage in the operating property or working circle can be measured accurately, this third method was used.

One major interest in this survey was to find out what kinds of cutting-practice policy are now being applied to operating forest lands. The method selected gives that result, by showing, for example, that 36 percent of the acreage in privately owned operating properties is now being managed with cutting practices that rate fair or better. This conclusion, for present purposes, is more significant than that some other percent of the timber cut is being harvested under fair or better practices, or that a certain percent of the lands being cut over are operated under the fair or better practices.

The first analysis of timber cutting practices is by ownership class as shown in table 1 and figure 1.

Table 1.--Character of timber cutting on commercial forest land

Ownership	Commercial forest area, million acres		Percent of cutting 1/						
	Total	Operating	High-order	Good	Fair	Poor	De-structive	Good and better	Poor and worse
All lands	461.0	402.8	3	20	25	46	6	23	52
Private	345.0	302.0	1	7	28	56	8	8	64
Public	116.0	100.8	8	59	19	13	1	67	14
National forests	73.5	64.8	11	69	19	1	0	80	1
Other Federal	15.4	12.5	6	37	32	24	1	43	25
State and local	27.1	23.5	3	44	10	41	2	47	43

1/ More specifically, the percent of operating acreage now being managed under cutting practices that rate high-order, good, fair, etc.

About 23 percent of the total operating commercial forest land acreage is being managed under cutting practices that rate good and high-order; the cutting practices on 52 percent of it rate poor and destructive.

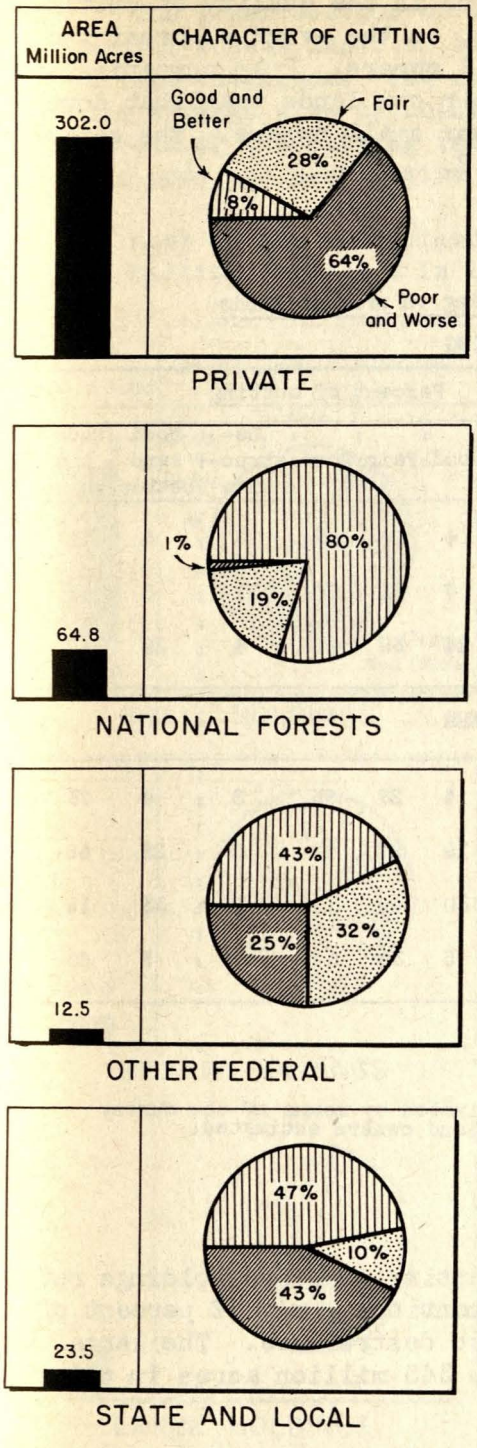


FIG. I - COMMERCIAL FOREST AREA IN OPERATING STATUS AND CHARACTER OF TIMBER CUTTING, BY OWNERSHIP CLASS.

For the sake of brevity and convenience, the ratings will occasionally be referred to in terms of "percent of cutting" or similar expressions, in the remainder of this report. The reader should bear in mind that this actually means the percent of operating forest land being managed under the specified level of cutting practice.

The cutting practices on public lands are notably superior to those on private lands. The favorable status of cutting practices on the public lands (67 percent good to high-order) is reason for some gratification. These good practices will not, however, go very far in assuring the country an adequate future supply of timber. The public lands contain only about one-fourth of the commercial forest acreage and considerably less than that proportion of the potential timber-producing capacity. Even on the public lands there is much to be done in the improvement of cutting practices. On the western national forests, 25 percent of the cutting rates below "good." On other Federal lands the percent of cutting rated below "good" is considerably greater. The same is true for State and local government lands.

It is, however, the privately owned lands that deserve most attention. They contain 75 percent of the commercial forest acreage. They contain much more than that proportion of the better site-class lands. Most of the privately owned timber is accessible. Until recently, something like 90 percent of the timber cut has come from the private lands. While this proportion will decrease somewhat, the private lands will undoubtedly remain our principal source of timber products. The cutting practices on these lands have a crucial bearing upon the country's future supplies of timber.

The survey disclosed wide variations in the quality of cutting practices on private lands. Large owners, on the average, treat their lands appreciably better than do the small owners. Pulp companies and lumber companies do better cutting on their own lands than that done on farmers' woodlands and on those of other small owners. The general situation is shown in table 2 and figure 2.

Table 2.--Character of timber cutting on private lands

BY SIZE OF HOLDING

Ownership class	Estimated number of owners 4/	Commercial forest area, million acres: Total	Operating	Percent of cutting: High-order	Good	Fair	Poor	Destructive	Good and better	Poor and worse
Small 1/	4,200,000	261.4	223.8	0	4	25	63	8	4	71
Medium 2/	3,200	32.9	29.6	1	7	31	50	11	8	61
Large 3/	398	50.7	48.6	5	24	39	28	4	29	32

BY TYPE OF OWNER

Farm	3,200,000	139.1	123.4	0	4	23	65	8	4	73
Lumber Co.	No data	36.6	34.4	6	19	27	42	6	25	48
Pulp Co.	No data	14.8	14.5	3	30	49	17	1	33	18
Other	No data	154.5	129.7	0	5	30	57	8	5	65

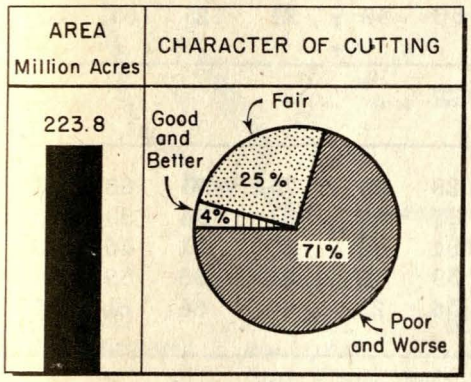
1/ In holdings of less than 5,000 acres.
2/ In holdings of 5,000 and up to 50,000 acres.
3/ In holdings of 50,000 acres and more.
4/ Total number of small and medium owners estimated by means of the survey sample. Large owners by actual count. Farm woodland owners estimated. See table 11.

The fact that 29 percent of the cutting on large holdings rates good to high-order is worthy of special mention. Only 32 percent of the cutting on these properties is poor to destructive. The large holdings, however, include only 51 of the 345 million acres in private ownership.

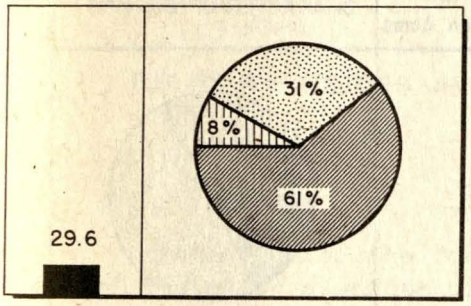
Three-fourths of the commercial forest acreage in private ownership is in the 4.2 million small holdings of less than 5,000 acres--the average is 62 acres. Good cutting is done on only 4 percent of these small holdings. Twenty-five percent of the cutting rates fair. The remaining 71 percent is poor and destructive. Herein lies the hard core of the private woodland management problem.

The lower section of table 2 shows that 139 million acres of the commercial forest land, or 40 percent of that which is privately owned, is in farm woodlands. The number of owners is estimated at 3.2 million and the average size of holding is 43 acres. In this large area, only 27 percent of the cutting rates fair and better; the remaining 73 percent is poor and destructive (see also fig. 3).

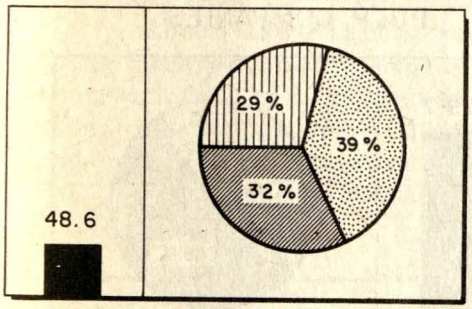
Most of the timberland held by lumber companies and pulp companies --51.4 million acres--is in large blocks. The total area held, however, amounts to less than 15 percent of total acreage in private ownership. On these lands, cutting practices are generally much better. Good and high-order ratings are given to 27 percent of the cutting. About 40 percent rates poor and destructive. The remaining 33 percent rates fair. Pulp-company lands get better treatment than those of the lumber companies.



SMALL HOLDINGS



MEDIUM HOLDINGS



LARGE HOLDINGS

FIG. 2 - PRIVATE COMMERCIAL FOREST AREA IN OPERATING STATUS AND CHARACTER OF TIMBER CUTTING, BY SIZE OF HOLDING.

The remaining 155 million acres, 45 percent of the area in private ownership, receives inferior treatment--only slightly better than that accorded to the farm woodlands. Like the farm woodlands, the bulk of these holdings are small.

Differences in cutting practices between the three great geographical sections--North, South, and West--are important (table 3). Insofar as the large owners are concerned, the best performance is in the South. Lumber companies of the South lead those of other sections by a wide margin. Pulp-company performance, generally better than that of the lumber companies, is also best in the South. Western pulp companies lag far behind. In contrast to industry performance, the cutting on other nonfarm lands rates low in the South and farm woodlands get no better treatment in the South than elsewhere. A further break-down of this information by 5 cutting-practice ratings and by 12 regions (fig. 4) is given in table 13.

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Table 3.--Regional character of timber cutting on private lands

BY SIZE OF HOLDING

Ownership class	Percent of cutting											
	Good and high-order				Fair				Poor and destructive			
	North	South	West	U.S.	North	South	West	U.S.	North	South	West	U.S.
Small	5	2	3	4	24	24	32	25	71	74	65	71
Medium	4	11	3	8	47	26	29	31	49	63	68	61
Large	9	52	9	29	62	25	38	39	29	23	53	32

BY TYPE OF OWNER

Farm	5	3	4	4	22	24	28	23	73	73	68	73
Lumber Co.	12	43	8	25	27	23	33	27	61	34	59	48
Pulp Co.	8	77	0	33	72	12	54	49	20	11	46	18
Other	6	6	2	5	32	26	39	30	62	68	59	65
Total	6	11	5	8	30	25	34	28	64	64	61	64

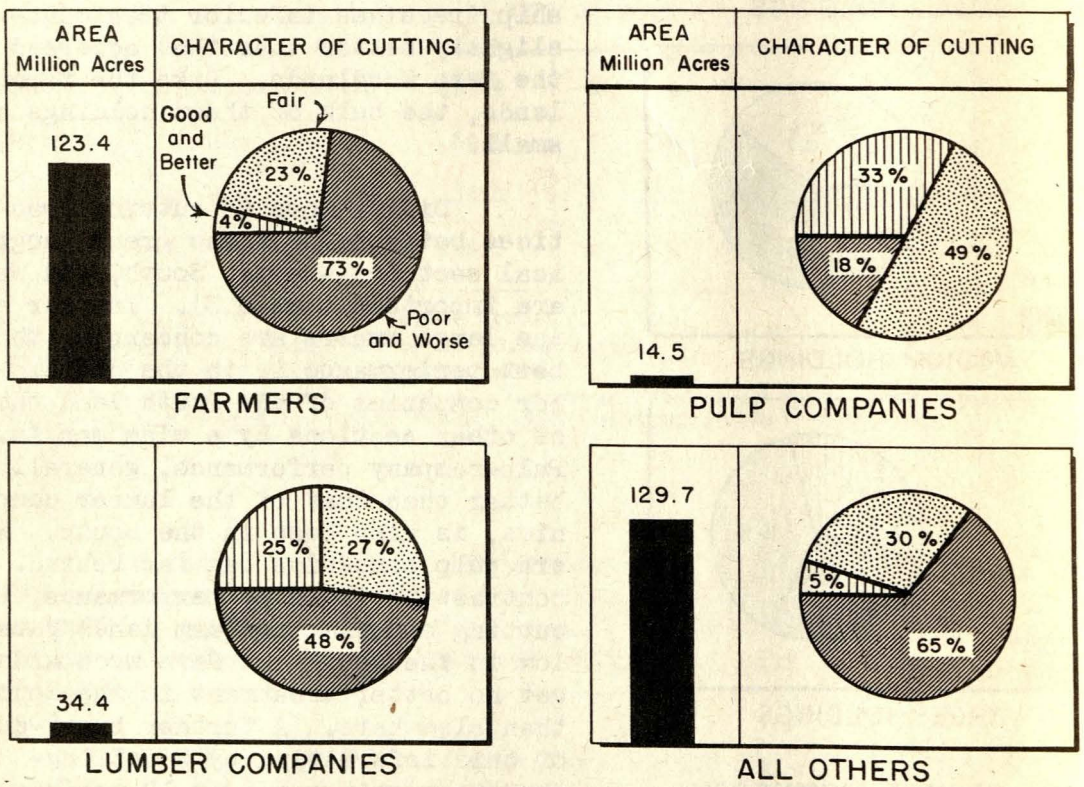

FIG. 3 - PRIVATE COMMERCIAL FOREST AREA IN OPERATING STATUS AND CHARACTER OF TIMBER CUTTING, BY TYPE OF OWNER.

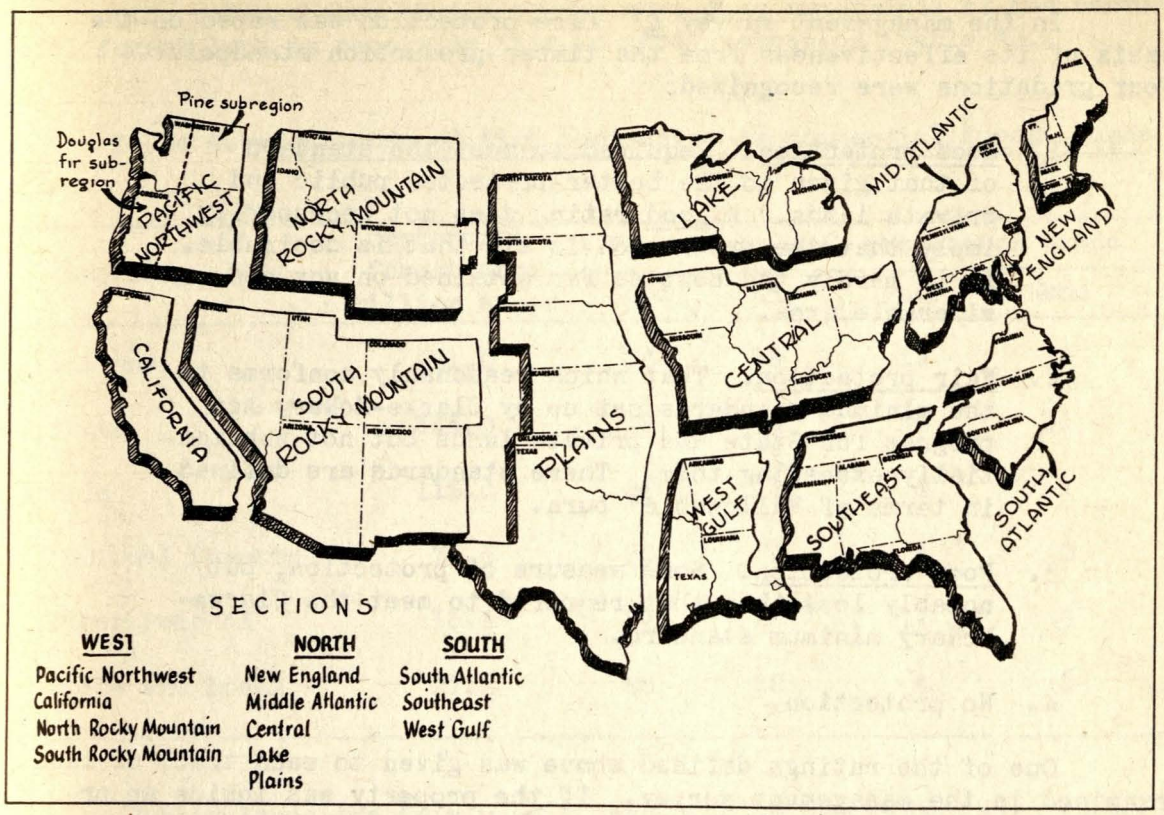

FIGURE 4 - REGIONS AND SECTIONS USED IN THIS REPORT.

Fire Protection

Protection of the forest against damage or destruction by fire is one of the major elements of forest management. 3/ In this field, there has been much more progress than in cutting practices.

About 196 million acres of our commercial forest lands are now being managed under cutting practices that rate fair and better. In contrast, 329 million acres are receiving fair and better fire protection. As for private lands alone, 109 million acres are being managed under fair and better cutting practices while 218 million receive fair and better fire protection.

3/ Insects and tree diseases now destroy more timber, but protection against them is not yet developed to the extent that it can be rated.

In the management survey 4/ fire protection was rated on the basis of its effectiveness from the timber-production standpoint. Four gradations were recognized:

1. Good protection. Required to meet the standard of that given to the better-protected public and private lands. A good rating does not necessarily imply that the protection is all that is desirable. It is merely the best so far attained on any considerable area.

2. Fair protection. That which reasonably conforms to the minimum standards set up by Clarke-McNary Act program for State and private lands but not substantially exceeding them. These standards are defined in terms of "allowable" burn.

3. Poor protection. Some measure of protection, but notably less than that required to meet the Clarke-McNary minimum standard.

4. No protection.

One of the ratings defined above was given to each tract of land examined in the management survey. If the property was inside an organized protection unit, it received the rating of the unit unless the owner had provided additional protection measures which warranted a higher rating. Lands outside of organized protection units were rated on the basis of the apparent fire record over the past several years and on the evident means of protection.

4/ The figures for private and State land from this survey differ considerably from those obtained by a reappraisal of the Clarke-McNary Act program. This is due in part to the fact that the management survey was limited to commercial forest whereas the Clarke-McNary study pertained to both commercial and noncommercial and to some nonforested watershed lands. Moreover, the management survey appraised the quality of protection on properties receiving no organized protection. Here many small holdings by virtue of location, the owners' vigilance, or by sheer good fortune, show little or no evidence of recent fire damage and hence received a fair or good rating. These properties when within unprotected territory were considered in need of organized protection in the Clarke-McNary study. Also some properties in an organized protection unit may have received a better rating in the management survey because of added protection, whereas in the Clarke-McNary study they received the blanket rating of the protection unit as a whole.

The ratings show that slightly more than two-thirds of the commercial forest land is receiving fair to good protection (table 4).

Table 4.--Character of fire protection on commercial forest lands

Ownership class	Commercial forest area, million acres	Percent in each protection grade			
		Good	Fair	Poor	None
All lands	461.0	36	35	19	10
Private	345.0	19	44	24	13
Public	116.0	84	11	4	1
National forests	73.5	98	1	1	0
Other Federal	15.4	54	25	17	4
State and local	27.1	66	28	4	2

Public lands are fairly well protected in comparison with private lands, which still have a long way to go to reach what is here called the good standard.

The critical problem lies in the privately owned lands and centers mainly in the southern regions. This is brought out in table 5, which gives a regional break-down of fire protection grades for privately owned lands.

Table 5.--Character of fire protection on private lands

Section	Commercial forest area, million acres	Percent in each protection grade				
		Good	Fair	Poor	None	Poor and none combined
North	139.6	22	60	12	6	18
South	167.0	7	35	37	21	58
West	38.4	64	27	9	0	9
United States	345.0	19	44	24	13	37

Details by regions and by ownership classes are given in table 14. The Southeast is an important timber-growing region; yet 74 percent of the privately owned lands located there get little or no protection. The West Gulf region is only a little better protected. The Central States also rank poorly in fire protection.

Sustained Yield

Too fast a rate of cutting, even under the better practices, can soon exhaust a supply of timber. The consequence is usually a drastic curtailment or a closing down of the dependent wood-using industry and disruption of the economic life of a whole community. The only insurance against this kind of economic and social waste is a planned operation whereby the timberlands within a convenient and economical operating radius are managed for continuous production. The planned annual harvest of timber products should be reasonably commensurate with the inherent productivity of the land. A mere balance of growth and drain at some low level of productivity does not suffice. The average annual drain should be roughly in balance with growth when reasonably good management is attained. On lands which have not yet reached that stage, the cut may be somewhat less, or it may even be more. On lands in process of rehabilitation it will be less. In certain stagnant old-growth stands being converted to young growing forests, it may be more. The important feature is the definite plan of cutting which will ultimately place the forest area on a permanent sustained-yield basis.

In the management survey, here reported, lands were classified in the sustained-yield category wherever there was evidence of a planned flow of products in substantially regular quantities on a continuous basis--provided that the planning was definitely recognizable and that the cutting was rated at least fair.

The sustained-yield test was applied only to publicly owned commercial forest land and to private holdings of 5,000 acres and more. (A few of the small private holdings are, no doubt, being managed on a sustained-yield basis, but evidence of a planned cut in regular quantities on a permanent basis is not easily recognized on such small properties.) In other words, the sustained-yield phase of the survey actually covered only about 25 percent of the privately owned lands. These are the lands which have the greater part of the good and high-order cutting. This fact should be kept in mind while considering the figures shown in table 6.

Table 6.--Percent of all cutting on a sustained-yield basis

Ownership class	Commercial forest area, million acres		Percent of cutting on sustained yield
	Total	Operating	
Public	116.0	100.8	57
National forests	73.5	64.8	72
Other Federal	15.4	12.5	44
State and local	27.1	23.5	23
Private - holdings of			
5,000 acres and more	83.6	78.2	28
Medium (only)	32.9	29.6	9
Large (only)	50.7	48.6	39

The fact that only 72 percent of the cutting on the national forests is on a sustained-yield basis is due, in part, to deficient cutting in some of the remote areas of the West. Actually, these lands are receiving good fire protection, the cutting policies have been established, and they are also being managed for other than timber purposes. The failure to qualify in the sustained-yield category is due principally to economic factors such as the lack of access roads or excessive logging costs due to high and rough terrain.

These same conditions are found to some extent on other publicly owned lands and on some of the private lands.

Sustained-yield cutting on privately owned lands has a very encouraging start on the large holdings. The owners of the medium-sized holdings have hardly yet begun sustained-yield cutting. No comparable data for the small holdings were obtained, but the low cutting-practice ratings of these properties 5/ indicate that there is little sustained-yield management.

The degree to which sustained yield has been attained varies considerably among the North, the South, and the West. On the national forests, all of the cutting in the South is on a sustained-yield basis; in the North, 75 percent; and in the West, 65 percent. For the large private holdings (over 50,000 acres) the corresponding break-down is: South 61 percent, North 32 percent, West 3 percent.

5/ See table 2, page 6.

The survey shows that the better cutting practices and sustained yield go hand in hand. In terms of percents, this relationship is given in table 7.

Table 7.--Percent of each cutting class on a sustained-yield basis

Ownership	High-order cutting	Good cutting	Fair cutting
National forests	93	68	76
Other Federal	100	61	47
State and local	23	44	35
Private (over 50,000 acres)	98	86	36
Private (5,000 to 50,000 acres)	68	46	16

In the case of large and medium private holdings, the better the cutting practice the more likely that the property is also on sustained yield. Those who practice good or better cutting are truly in the business of growing trees for future as well as present harvest.

Management Status of Commercial Forest Lands

Three major aspects of timber management--cutting practice, fire protection, and sustained yield--have been considered. The specific combination of these that is being applied to any given forest property measures the degree of forest management. The practical difficulties in applying a sustained-yield test to most of the privately owned lands, however, make it infeasible to include that factor in our present definition of management grades. The four grades of management which have been set up are based on quality of cutting practices and of fire protection. From highest to lowest, they are as follows:

1. Intensive management requires high-order cutting and good fire protection.

2. Extensive management requires at least fair cutting and fair fire protection.

   a. Good extensive requires good cutting as a minimum.

   b. Fair extensive requires fair cutting as a minimum.

3. Without management implies that either the cutting practices or the fire protection, or both, rate poor or worse.

4. Nonoperating area implies that the area is not being operated for timber products.

All commercial forest lands

Thirty-five percent of the commercial forest land is under management (table 8). Only 2 percent is intensively managed, 16 percent is under good extensive management, and 17 percent receives only fair extensive management.

Table 8.--Management status of commercial forest lands

Ownership	Commercial forest area, million acres	Percent on various management levels				
		Intensive	Extensive		Without	Nonoperating 1/
			Good	Fair		
All lands	461.0	2.1	16.1	17.3	51.9	12.6
Private	345.0	0.6	4.4	18.0	64.6	12.4
Public	116.0	6.6	51.2	15.0	14.0	13.2
National forests	73.5	8.9	60.8	16.7	1.8	11.8
Other Federal	15.4	3.1	30.9	18.5	28.2	19.3
State and local	27.1	2.3	36.8	8.3	39.3	13.3

1/ Part of these lands receive fire protection.

Private forest lands

Of the privately owned lands, those held by the large industrial owners show much better management than the lands held by the small nonindustrial and farm owners. Table 9 shows the situation in some detail.

Table 9.—Management status of privately owned commercial forest lands

BY SIZE OF HOLDING

Size or type of ownership	Area held : mil. acres	Percent on various management levels			
		Intensive	Extensive	Without	Nonoperating
Small	261.4	0.1	18.0	67.5	14.4
Medium	32.9	0.1	23.9	65.9	10.1
Large	50.7	3.6	44.0	48.4	4.0

BY TYPE OF OWNER

Farm	139.1	0.1	16.9	71.8	11.2
Lumber	36.6	3.4	32.2	58.5	5.9
Pulp	14.8	2.6	66.7	28.2	2.5
Other	154.5	0.2	20.7	63.0	16.1

The three sections of the country show notable differences in percent of private forest land under management (table 10). The North and West rate much higher than the South when both cutting practices and fire protection are considered. As noted previously, it is poor fire protection that lowers the South's rank in forest management.

Table 10.--Percent of privately owned commercial forest land under management and under various combinations of poor practice in the below-extensive-management class

Section	Intensive and extensive management combined	Below extensive management: Low-grade cutting 1/	Low-grade fire protection 2/	Both cutting and protection of low grade	Nonoperating area	All classes	Commercial forest area
	Percent	Percent	Percent	Percent	Percent	Percent	Million acres
North	28.3	43.2	3.5	13.9	11.1	100.0	139.6
South	17.3	18.8	14.7	38.7	10.5	100.0	167.0
West	28.3	39.7	0.6	5.3	26.1	100.0	38.4
United States	23.0	31.1	8.6	24.9	12.4	100.0	345.0

1/ Protection "fair" or better.
2/ Cutting "fair" or better.

Throughout the country, it is the small ownerships, both farm and nonfarm, that get the worst treatment. The principal factor that puts these properties on the submanagement level is poor and destructive cutting practices. 6/

National-forest lands

Consideration of the management status of commercial forest lands in the national forests by geographical sections shows important differences. In comparison with that in the West, it is better in the North and South, where virtually all of such area is under active timber management. In these two sections, however, the national forests contain less than 6 percent of the total commercial forest acreage. The western national forests include half the commercial forest area in the section. Here the business of intensive management has hardly begun. Less than 2 percent of the national-forest commercial acreage is so treated. A little more than 81 percent is under extensive management. The remaining 17 percent is mostly in nonoperating working circles where cutting has so far been either economically undesirable or impossible. Most of the extensive management on national forests is on the higher level, which implies cutting practices that are good or better. 7/

6/ For details, see tables 15 and 16.
7/ Further detail on the management status of the national forests is in table 17.

Indications of Progress

Specific data on the management status of commercial forest lands have not heretofore been collected. Hence there is little or no basis for a definite measurement of recent progress in forest management throughout the country. Indications of progress can, however, be found.

In 1938 the Forest Service estimated that less than two-thirds of the commercial forest land in the national forests was in a full timber operating status. The brisk wartime demand for all types of forest products has made it possible to materially shrink the nonoperating commercial forest area of the national forests. The bulk of this nonoperating area is in the high mountains of the West. In the North and South, the strong demand for timber has enabled the Service to intensify management by various kinds of timber-stand-improvement cuttings. The net effect of these influences has been to increase the area in full timber-operating status and intensify timber management. The total area in working circles in which some cutting is going on now embraces about 88 percent of the commercial forest lands. The current program of access-road construction will soon push this percent still higher.

There are clear indications that forest management is making progress on the large holdings of lumber and pulp companies. Lands owned by the pulp companies now show indications of good management: more than two-thirds of the acreage in their holdings is under intensive and extensive management. The lumber companies have made a substantial beginning: one-third of the area they control is under intensive or extensive management. A considerable number of the large owners are organizing to apply forest management to their lands. It was reported in 1945 that about 500 technical foresters were in the employ of the forest industries. The number is steadily increasing.

The small private holdings, both farm and nonfarm, show least progress toward timber management. The survey shows that 18 percent of the acreage in small holdings is under intensive or extensive management. Yet small holdings include over half of the total commercial forest acreage and about three-fourths of the private. There are about 4¼ million separate holdings. The average size is 62 acres, but three-fourths of the owners hold less than that amount. Only 2 percent own more than 500 acres.

Efforts to improve the management of small forest holdings have been notably successful in a few localities. These achievements--good as they are--should not, however, divert attention from the total national picture. Recent reports of activities under the cooperative Federal-State programs for on-the-ground technical aid to farm woodland owners and for forestry extension work show that available facilities are very inadequate to reach 3.2 million farm woodland owners, to say nothing of the million owners of small nonfarm woodlands.

Even the publicly supported fire control programs, on which steady progress has been made in many regions, are notably deficient in the South and in the Central States, where there is a great concentration of small owners.

There are several industry programs to promote better practices. Among these are the forestry program of the American Forest Products Industries, the "Tree Farm" and "Keep Green" programs, and the program of the Southern Pulpwood Conservation Association.

All these, both public and private, are good so far as they go, but the job of reaching the 4¼ million small owners is so enormous that the combined efforts of all agencies, both public and private, need to be stepped up to a scale several times greater than we now have.

The Job Ahead

A huge demand for construction lumber to increase and improve housing and to help put the whole national economy on a high production basis is now upon us. Pulpwood demands are likewise increasing. What should be done to meet the situation that confronts us? We can, of course, follow in the path of least resistance and go on consuming the saw-timber growing stock of the forests until a balance of growth and drain is finally reached at some low level. Other materials can be used for many purposes in place of wood. In comparison with wood, however, these materials generally require a greater expenditure of human and mechanical energy in extracting them from the earth and shaping them for human use. Most of these materials, moreover, are in the category of nonrenewable resources. Intensive exploitation usually implies the necessity to find ways to utilize raw materials of progressively lower grade, with some economic loss. By following such a course we as a Nation would be that much poorer than we might have been, had we taken advantage of nature's productive forces in our forest lands. The policy that is more sensible and will contribute more to the Nation's wealth and welfare is to nurture the forests in such a way that they will yield wood products in a volume and quality commensurate with needs determined on a reasonably generous basis.

To follow such a policy, it will be necessary to bring most of the commercial forest lands of the United States under management. This does not imply that every acre of forest land must produce to its utmost. There is plenty of margin for the recognition of

economic and physical limitations which make the highest order of management impracticable in many areas. A goal of an annual yield of 20 billion cubic feet of wood including 65 to 72 billion board feet of saw timber 8/ is considered to be a reasonable objective which can be reached--provided we plan for it on a broad enough front and vigorously adhere to the plans.

Figure 5 is an attempt to picture the job ahead in quantitative terms. The bar on the left indicates the management status of all commercial forest lands in 1945. The bar on the right gives a tentative indication of the management status that might reach the sustained-production goal of 20 billion cubic feet annually. No one knows, of course, just how much acreage should be put under intensive management, how much under extensive management, or how much would be in a nonoperating status. The combination of management grades depicted could give about the timber yield that is desired. A larger area under intensive management would, of course, yield more timber and thereby permit less-exacting management standards on the remaining lands. There is room for flexibility within the two grades of management but not much room for lands that receive no management at all. At present, only about 85 million acres out of the total of 461 million are under good management. Another 80 million acres are under a low grade of extensive management. Ultimately the acreage managed on a reasonably good level could well be 400 million or more. The remainder should be under fire protection.

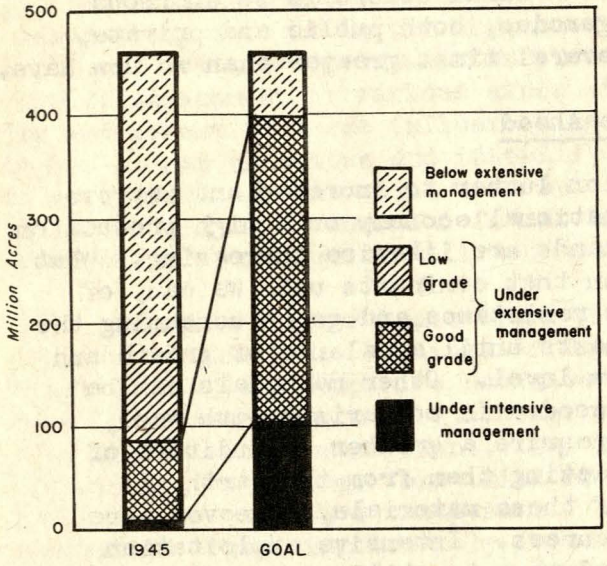

FIGURE 5 - THE MANAGEMENT STATUS OF COMMERCIAL FOREST LANDS IN THE UNITED STATES IN 1945 COMPARED TO A POSSIBLE GOAL UNDER A VIGOROUS FOREST PROGRAM.

8/ This growth goal is based on estimates given in: U.S. Forest Service. Potential Requirements for Timber Products in the United States. (Reappraisal report.) Washington. 1946. See also: U.S. Forest Service. Gaging the Timber Resource of the United States. (Reappraisal report.) Washington. 1946.

Obviously there is no simple, quick, and easy way to bring such a vast acreage of forest land under good management. At least five major tasks lie ahead. In brief they are:

1. More protection.--The Clarke-McNary study, previously mentioned, shows that about 128 million acres of commercial forest land not yet given the benefit of organized fire protection should have it as soon as possible. 9/ Further, there is a large acreage now receiving some protection but badly in need of much stronger protection. In the Southeast, West Gulf, and Central regions the need is particularly urgent. In those regions the forest lands are almost entirely in private ownership. The area so owned comprises about 37 percent of all commercial forest lands in the Nation, yet one-half or more of this acreage in each of these regions is now receiving either poor fire protection or none.

Forest insects and diseases, although less conspicuous, now destroy more timber than is lost by fire. Such losses are greatest in the unmanaged and poorly managed forests. Control is difficult because it involves a whole arsenal of technical measures--quarantine, eradication of host plants, use of insecticides and counter-parasites, protective cutting to alter stand composition and to remove vulnerable trees, etc. The existing program, including timber management practices allied to the protection task, needs to be expanded and intensified. 10/

2. More planting.--About 75 million acres of forest land have been so poorly handled in the past that they are now classified as poorly stocked seedling and sapling or deforested areas. Except for certain lands (unusually dry and unfavorable sites in the West and lands used for special purposes such as game habitat or military training grounds), these areas should be restored to a reasonable productivity. As a rule this means planting. The net acreage is about 67 million. Practical considerations, however, make it doubtful that all of this acreage will be considered in any maximum planting program that can now be foreseen.

Larger and quicker returns can, in many cases, be obtained by "interplanting" the openings in existing sparse stands. Given a sufficient period of time and good protection, nature by herself could do this job, but our need for an increased volume of growing stock is good reason for not waiting that long. There are about 23 million acres that would greatly benefit by interplanting.

So far, the forest land planted in the United States adds up to less than 5 million acres. The area now in need of planting and of interplanting presents a huge task. Whether it will be done or not depends on how fast we want to move in stepping up the ultimate production of our forest lands.

9/ See footnote 4, page 10.

10/ The subject of forest insects and diseases is treated in detail in another report from the reappraisal of the forest situation.

3. Stand improvement.--One way to lessen the pressure on growing stock, increase the level of management, and still get a reasonable commodity cut from our forest stands is to take as much of the harvest as practicable in the form of poor and partially defective trees and in trees of the less desirable species. The effect of this would be to leave more of the straight and more desirable trees for future growth toward higher-quality products. Weedings, improvement cuttings, thinnings and pruning in young stands will greatly increase the potential value of later harvests. Much of this timber-stand-improvement work can be carried out in conjunction with the harvesting of the smaller forest products. However, in younger stands, and where pruning is involved, the work usually must be done as a separate undertaking. It has been roughly estimated that about 85 million acres of the younger stands might well be pruned, weeded, or thinned.

4. Waste reduction.--Historically the harvesting of timber has been a wasteful operation. A large volume of material has been left in the woods where it clutters the ground, suppressing reproduction and providing fuel for destructive fires. Another large amount appears as waste at the primary mills. In 1944, only 51 percent of the cubic-foot volume of trees cut appeared in the primary timber products--lumber, pulpwood, etc. The remaining 49 percent was dropped as logging and primary milling waste. 11/ Of this 49 percent, 16 was used as fuel and 33 was not used at all. There is, of course, no possibility that all of the waste can be utilized. Nevertheless, much can be done to make more complete use of the trees cut and to prevent logging waste from menacing the new forest growth. These opportunities are greatest in the Douglas-fir forests of Oregon and Washington, where as much as 11 thousand board feet of sawlog material per acre has been left in the woods.

5. Improved cutting practices.--Better cutting practices in harvesting merchantable timber is the focal point of the management job ahead. Better protection, more planting and stand improvement, and waste reduction are parts of the over-all problem. Important as these things are, our objective of forest products adequate for future needs will not be attained unless satisfactory cutting practices are applied by the 4¼ million private forest-land owners.

11/ In addition to this there was about 500 million cubic feet of wood waste in secondary lumber manufacturing plants and another 8.6 million tons (oven-dry weight) of lignin and other chemical fractions of wood discharged from the digesters of pulp mills. The combined logging, primary milling, and secondary wastes are estimated at 57 percent of the drain on a weight basis.

The subject of wood waste is treated in another report from the reappraisal of the forest situation.

Table 11.-- Number of private owners of commercial forest land in the United States and the average size of holding by size of ownership[1], by region, 1945[2]

(Farm and nonfarm combined)

Region	All owners			Small (under 5,000 A.)			Medium (5,000 to 50,000 A.)			Large (over 50,000 A.)		
	Number	Total, thousand acres	Average, acres	Number	Total, thousand acres	Average, acres	Number	Total, thousand acres	Average, acres	Number	Total, thousand acres	Average, acres
New England	243,958	29,294	120	243,719	17,661	72	194	2,150	11,082	45	9,483	210,733
Middle Atlantic	514,908	36,497	71	514,768	32,702	64	115	1,722	14,974	25	2,073	82,920
Lake States	586,472	29,045	50	586,347	24,545	42	91	1,260	13,846	34	3,240	95,294
Central States	987,445	41,770	42	987,353	40,068	41	85	1,185	13,941	7	517	73,857
Plains	121,607	2,990	25	121,607	2,990	25	...	...	...	...	...	...
North	2,454,390	139,596	57	2,453,794	117,966	48	485	6,317	13,025	111	15,313	137,955
South Atlantic	526,056	38,902	74	525,706	33,068	63	312	2,938	9,417	38	2,896	76,211
Southeast	679,306	82,265	121	677,750	58,227	86	1,456	13,799	9,477	100	10,239	102,390
West Gulf	446,564	45,861	103	446,000	30,771	69	483	4,766	9,867	81	10,324	127,457
South	1,651,926	167,028	101	1,649,456	122,066	74	2,251	21,503	9,553	219	23,459	107,119
North Rocky Mountain	20,967	7,352	351	20,930	3,868	185	27	318	11,778	10	3,166	316,600
South Rocky Mountain	7,486	2,957	395	7,383	1,766	239	96	838	8,729	7	353	50,429
Pacific Northwest	72,586	19,757	272	72,390	11,735	162	163	2,526	15,497	33	5,496	166,545
California	18,351	8,283	451	18,184	3,984	219	149	1,414	9,490	18	2,885	160,278
West	119,390	38,349	321	118,887	21,353	180	435	5,096	11,715	68	11,900	175,000
All regions	4,225,706	344,973	82	4,222,137	261,385	62	3,171	32,916	10,380	398	50,672	127,317

1/ In the northern and southern regions, 70 percent of the small farm and nonfarm owners have woodlands which do not exceed 50 acres each; 16 percent have holdings which vary in size from 50 to 100 acres, 12 percent vary from 100 to 500, and only 2 percent of the small owners have holdings exceeding 500 acres each.

2/ The average size of farm woodlands is 43 acres. About 900 farm woodlands are in the medium size group.

Table 12.--Character of cutting on public commercial forest lands, by sections of the United States

Ownership	Commercial forest area, million acres		Percent of cutting						
	Total	Operating	High-order	Good	Fair	Poor	De-structive	Good and better	Poor and worse
North:									
National forests	9.5	9.5	26	66	8	0	0	92	0
Other Federal	1.8	1.5	31	25	39	5	0	56	5
State	11.9	9.9	6	72	8	14	0	78	14
Local	7.5	7.2	0	28	2	70	0	28	70
South:									
National forests	10.1	10.1	37	58	5	0	0	95	0
Other Federal	3.9	3.5	10	16	27	47	0	26	47
State	2.0	1.9	5	42	4	46	3	47	49
Local	.1	-	1	68	10	21	0	69	21
West:									
National forests	53.9	45.2	2	73	24	1	0	75	1
Other Federal	9.7	7.5	0	49	34	16	1	49	17
State	4.0	3.7	0	8	33	50	9	8	59
Local	1.6	.8	0	0	12	67	21	0	88
United States:									
National forests	73.5	64.8	11	69	19	1	0	80	1
Other Federal	15.4	12.5	6	37	32	24	1	43	25
State	17.9	15.5	4	53	13	27	3	57	30
Local	9.2	8.0	0	25	3	70	2	25	72

Table 13.--Character[1] of timber cutting on commercial forest lands in the United States, by ownership and region - 1945

Region	All ownerships: Operating commercial forest area, thousand acres	All ownerships: Percent of cutting[2]: High order	Good	Fair	Poor	Destructive	National forest: Operating commercial forest area, thousand acres	National forest: Percent of cutting[2]: High order	Good	Fair	Poor	Destructive	Other Federal: Operating commercial forest area, thousand acres	Other Federal: Percent of cutting[2]: High order	Good	Fair	Poor	Destructive	State and local: Operating commercial forest area, thousand acres	State and local: Percent of cutting[2]: High order	Good	Fair	Poor	Destructive
New England	29,964	..	10	57	28	5	814	2	56	42	..	..	13	..	100	..	..	..	576	4	76	17	3	..
Middle Atlantic	31,624	3	13	33	45	6	1,257	6	80	14	..	..	34	..	100	..	..	..	1,487	38	38	18	6	..
Lake States	44,399	6	28	12	46	8	5,455	43	55	2	..	..	1,017	45	25	23	7	..	14,714	..	54	3	43	..
Central States	42,948	..	8	12	73	7	1,951	..	94	6	..	..	117	..	67	32	1	..	322	..	83	14	3	..
Plains	3,326	2	4	33	53	8	30	53	47	..	..	..	302	..	..	100	..	..	4	..	..	100	..	..
North	152,261	2	15	26	50	7	9,507	26	66	8	..	..	1,483	31	25	39	5	..	17,103	3	54	5	38	..
South Atlantic	37,507	1	13	30	54	2	2,707	10	70	20	..	..	473	1	26	70	3	..	440	13	53	10	24	..
Southeast	83,831	2	11	24	54	9	3,802	31	69	..	..	..	2,005	15	13	28	44	..	1,215	2	46	4	43	5
West Gulf	43,720	11	15	17	54	3	3,561	64	36	..	..	..	1,067	3	18	5	74	..	285	2	10	..	88	..
South	165,058	4	13	23	54	6	10,070	37	58	5	..	..	3,545	10	16	27	47	..	1,940	4	43	5	45	3
North Rocky Mountain	26,565	3	45	32	19	1	16,930	.	63	30	2	..	1,206	..	55	32	13	..	1,355	..	9	38	52	1
South Rocky Mountain	12,761	..	78	12	8	2	9,555	..	91	9	..	..	1,123	..	95	5	..	..	312	..	31	50	19	..
Pacific Northwest	39,557	..	35	35	23	7	16,126	..	68	31	1	..	5,058	..	39	41	19	1	2,807	..	2	24	57	17
California	6,589	1	40	11	46	2	2,587	2	98	..	..	..	53	..	..	15	47	38	0	..	..	..	..	..
West	85,452	1	45	29	21	4	45,198	2	73	24	1	..	7,440	..	49	34	16	1	4,474	..	6	30	53	11
All regions	402,771	3	20	25	46	6	64,775	11	69	19	1	..	12,468	6	37	32	24	1	23,517	3	44	10	41	2

Region	All private holdings						Small private holdings (under 5,000 acres)						Medium private holdings (5,000 to 50,000 acres)						Large private holdings (over 50,000 acres)					
New England	28,561	..	7	58	29	6	17,037	..	6	40	45	9	2,041	1	8	79	12	..	9,483	..	9	86	5	..
Middle Atlantic	28,846	..	9	35	50	6	25,410	1	10	36	46	7	1,457	1	3	27	65	4	1,979	..	8	14	78	..
Lake States	23,213	..	5	20	60	15	19,032	..	4	19	59	18	1,092	..	4	24	69	3	3,089	..	9	27	64	..
Central States	40,558	..	3	12	77	8	38,856	..	3	12	77	8	1,185	..	..	37	57	6	517	..	4	1	95	..
Plains	2,990	2	4	26	59	9	2,990	2	4	26	59	9	...	..	..	..	..	..	...	..	..	..	..	..
North	124,168	..	6	30	56	8	103,325	..	5	25	60	10	5,775	..	4	47	46	3	15,068	..	9	62	29	..
South Atlantic	33,887	1	7	30	60	2	28,400	..	4	31	63	2	2,673	4	10	38	48	..	2,754	..	44	16	40	..
Southeast	76,809	1	8	25	57	9	53,586	..	2	23	67	8	13,161	..	8	26	48	18	10,062	4	36	36	20	4
West Gulf	38,807	6	13	19	58	4	24,650	..	1	20	75	4	4,106	6	13	19	57	5	10,051	20	44	17	15	4
South	149,503	2	9	25	58	6	106,696	..	2	24	68	6	19,940	2	9	26	50	13	22,867	11	41	25	20	3
North Rocky Mountain	7,074	1	5	34	56	4	3,659	..	2	35	57	6	249	..	13	18	68	1	3,166	2	8	35	53	2
South Rocky Mountain	1,771	..	4	26	55	15	828	..	5	37	51	7	678	..	4	10	64	22	265	..	..	36	46	18
Pacific Northwest	15,566	..	6	38	40	16	7,980	..	3	33	48	16	2,159	..	2	37	49	12	5,427	..	11	47	24	18
California	3,929	..	3	18	76	3	1,281	..	2	17	76	5	806	..	3	24	67	6	1,842	..	3	15	81	1
West	28,340	..	5	34	50	11	13,748	..	3	32	54	11	3,892	..	3	29	56	12	10,700	..	9	38	43	10
All regions	302,011	1	7	28	56	8	223,769	..	4	25	63	8	29,607	1	7	31	50	11	48,635	5	24	39	28	4

Region	Farm woodlands						Lumber company holdings						Pulp company holdings						Other non-farm holdings					
New England	6,311	1	4	43	44	8	2,324	1	20	29	44	6	6,285	..	9	88	3	..	13,641	..	5	56	31	7
Middle Atlantic	9,963	..	9	38	46	7	1,121	1	5	26	62	6	760	..	14	7	79	..	17,002	1	9	35	49	6
Lake States	11,954	..	4	17	58	21	1,634	..	4	24	70	2	1,200	..	..	29	64	7	8,425	..	6	24	61	9
Central States	24,943	..	3	11	76	10	217	..	7	35	45	13	...	..	..	..	..	..	15,398	..	3	13	80	4
Plains	2,960	1	5	26	59	9	15	..	..	33	67	..	...	..	..	..	..	..	15	..	..	67	33	..
North	56,131	..	5	22	62	11	5,311	1	11	27	56	5	8,245	..	8	72	19	1	54,481	..	6	32	55	7
South Atlantic	20,016	1	4	28	65	2	2,600	..	5	50	42	3	961	..	90	6	4	..	10,310	1	6	31	60	2
Southeast	30,720	..	2	24	66	8	5,824	2	27	26	44	1	2,491	4	72	22	2	..	37,774	..	5	26	56	13
West Gulf	10,107	..	1	17	79	3	7,492	25	43	11	18	3	1,923	20	53	3	24	..	19,285	..	5	25	65	5
South	60,843	..	3	24	68	5	15,916	12	31	23	31	3	5,375	9	68	12	11	..	67,369	1	5	26	59	9
North Rocky Mountain	2,682	..	1	37	58	4	3,414	2	8	24	61	5	...	..	..	..	..	..	978	..	4	62	33	1
South Rocky Mountain	1,100	..	5	16	62	17	467	..	1	47	38	14	...	..	..	..	..	..	204	..	3	34	63	..
Pacific Northwest	2,264	1	8	26	38	27	7,323	..	9	38	37	16	844	..	..	54	42	4	5,135	..	1	43	43	13
California	454	..	2	7	88	3	1,978	..	3	26	71	..	...	..	..	..	..	..	1,497	..	3	10	80	7
West	6,500	..	4	28	54	14	13,182	..	8	33	48	11	844	..	..	54	42	4	7,814	..	2	39	49	10
All regions	123,474	..	4	23	65	8	34,409	6	19	27	42	6	14,464	3	30	49	17	1	129,664	..	5	30	57	8

1/ High-order cutting requires the best types of harvest cutting which will build up and maintain quality and quantity yields consistent with the full productive capacity of the land. Wherever needed, it requires timber stand improvement cuttings, planting, and control of grazing.

Fair cutting marks the beginning of cutting and cultural treatments which will maintain the land with any reasonable stock of growing timber in species that are desirable and marketable.

Destructive cutting leaves the land without timber values and without means for natural reproduction.

2/ More specifically, the percent of operating acreage now being managed under cutting practices that rate high order, good, fair, etc.

1/ Good cutting requires that the cut be made in accordance with good silviculture and that the land be left in possession of desirable species in good condition for future growth. It is substantially better than the class below and should contain some of the elements of the class above.

Poor cutting leaves the land with a limited means for natural reproduction - often in the form of remnant seed trees on broad areas otherwise clear-cut of all merchantable timber. In second-growth forests, poor cutting robs the stand of minimum-size merchantable trees in stages of rapid growth. Such cutting often causes deterioration of species with consequent deterioration in both quantity and quality of forest growth.

Table 14.--Character of fire protection on commercial forest lands of the United States in percent of area, by ownership and region - 1945

Region	All ownerships					National forest					Other federal					State and local				
	Commercial forest area	Percent in each protection grade 1/				Commercial forest area	Percent in each protection grade				Commercial forest area	Percent in each protection grade				Commercial forest area	Percent in each protection grade			
	Thousand acres	Good	Fair	Poor	None	Thousand acres	Good	Fair	Poor	None	Thousand acres	Good	Fair	Poor	None	Thousand acres	Good	Fair	Poor	None
New England	30,851	7	93	..	..	822	100	..	..	..	69	..	100	..	..	666	36	64	..	..
Middle Atlantic	41,586	13	82	5	..	1,265	98	2	..	..	211	..	100	..	..	3,613	60	40	..	..
Lake States	50,345	76	21	3	..	5,455	100	..	..	..	1,040	46	54	..	..	14,805	74	26	..	..
Central States	44,213	20	33	29	18	1,951	95	4	1	..	166	96	2	2	..	326	9	83	8	..
Plains	3,326	11	43	34	12	30	100	..	..	..	302	..	..	100	..	4	..	..	100	..
North	170,321	32	53	10	5	9,523	99	1	..	..	1,788	36	47	17	..	19,414	69	31	..	..
South Atlantic	42,923	21	53	21	5	2,775	87	..	13	..	710	11	30	59	..	536	15	31	53	1
Southeast	89,390	6	23	40	31	3,802	79	9	12	..	2,107	24	5	67	4	1,216	9	30	19	42
West Gulf	50,953	13	33	42	12	3,561	93	7	..	..	1,123	24	7	25	44	408	4	6	88	2
South	183,266	11	33	36	20	10,138	86	6	8	..	3,940	22	10	53	15	2,160	10	25	41	24
North Rocky Mountain	29,066	93	4	3	..	18,061	100	..	..	..	1,951	57	35	8	..	1,702	85	9	6	..
South Rocky Mountain	15,782	89	6	4	1	10,765	100	..	..	..	1,680	96	4	..	..	380	73	27	..	..
Pacific Northwest	46,204	81	19	..	..	17,341	100	..	..	..	5,671	69	31	..	..	3,435	70	30	..	..
California	16,405	66	21	13	..	7,684	100	..	..	..	415	60	40	..	..	23	60	40	..	..
West	107,457	83	13	4	..	53,851	100	..	..	..	9,717	71	27	2	..	5,540	75	23	2	..
All regions	461,044	36	35	19	10	73,512	98	1	1	..	15,445	54	25	17	4	27,114	66	28	4	2

	All private holdings					Small private holdings (under 5,000 acres)					Medium private holdings (5,000 to 50,000 acres)					Large private holdings (over 50,000 acres)				
New England	29,294	3	97	..	..	17,661	..	100	..	..	2,150	7	93	..	..	9,483	9	91	..	..
Middle Atlantic	36,497	6	89	5	..	32,702	6	89	5	..	1,722	1	91	8	..	2,073	6	89	5	..
Lake States	29,045	73	22	5	..	24,545	69	25	6	..	1,260	94	6	..	..	3,240	97	3	..	..
Central States	41,770	16	34	31	19	40,068	16	34	31	19	1,185	1	63	35	1	517	..	25	61	14
Plains	2,990	11	47	28	14	2,990	11	47	28	14	..	..	..	..	..	..	..	..	..	..
North	139,596	22	60	12	6	117,966	22	57	14	7	6,317	21	70	9	..	15,313	27	70	3	..
South Atlantic	38,902	16	57	21	6	33,068	18	62	15	5	2,938	6	36	41	17	2,896	2	29	69	..
Southeast	82,265	2	24	41	33	58,227	2	22	42	34	13,799	2	26	37	35	10,239	5	31	42	22
West Gulf	45,861	7	36	45	12	30,771	2	37	47	14	4,766	1	41	42	16	10,324	22	32	42	4
South	167,028	7	35	37	21	122,066	6	36	36	22	21,503	2	31	38	29	23,459	12	31	46	11
North Rocky Mountain	7,352	85	5	10	..	3,868	77	7	16	..	318	68	14	18	..	3,166	98	1	1	..
South Rocky Mountain	2,957	45	29	22	4	1,766	52	35	9	4	838	29	16	48	7	353	45	31	24	..
Pacific Northwest	19,757	70	30	..	..	11,735	68	32	..	..	2,526	67	33	..	..	5,496	76	24	..	..
California	8,283	35	38	27	..	3,984	33	43	24	..	1,414	25	26	49	..	2,885	43	39	18	..
West	38,349	64	27	9	..	21,353	62	30	8	..	5,096	49	27	23	1	11,900	73	22	5	..
All regions	344,973	19	44	24	13	261,385	18	45	24	13	32,916	13	38	30	19	50,672	31	41	23	5

1/ Good protection is required to meet the standard of that which is given to the better protected public and private lands. A good rating does not necessarily imply that the protection is all that is desirable. It is merely the best that has so far been attained on any considerable area.

Poor protection implies some measure of protection but notably less than that required to meet the Clarke-McNary minimum standard.

Fair protection is that which reasonably conforms to the minimum standards set up by the Clarke-McNary Act program for State and private lands but not substantially exceeding them. These standards are defined in terms of "allowable" annual burn.

No protection means just that.

Table 15.--Management status[1] of commercial forest lands in the United States, by ownership and region - 1945

Region	All ownerships					All private holdings					Farm woodlands				
	Commercial forest area	Percent on various management levels				Commercial forest area	Percent on various management levels				Commercial forest area	Percent on various management levels			
	Thousand acres	Intensive	Extensive	Without	Non-operating	Thousand acres	Intensive	Extensive	Without	Non-operating	Thousand acres	Intensive	Extensive	Without	Non-operating
New England	30,851	0.2	64.9	32.0	2.9	29,294	0.1	63.8	33.6	2.5	6,477	...	46.3	51.2	2.5
Middle Atlantic	41,586	1.8	34.4	39.9	23.9	36,497	0.3	33.5	45.2	21.0	11,854	0.3	38.1	45.6	16.0
Lake States	50,345	5.2	35.3	47.7	11.8	29,045	0.2	19.0	60.7	20.1	13,930	0.2	16.8	68.8	14.2
Central States	44,213	...	10.1	87.1	2.8	41,770	...	5.1	92.0	2.9	25,789	...	5.3	91.4	3.3
Plains	3,326	1.8	23.2	75.0	...	2,990	1.5	25.3	73.2	...	2,960	1.5	25.1	73.4	...
North	170,321	2.0	33.7	53.7	10.6	139,596	0.2	28.1	60.6	11.1	61,010	0.2	19.6	72.2	8.0
South Atlantic	42,923	0.2	27.7	59.5	12.6	38,902	0.1	24.0	63.0	12.9	23,377	0.1	23.1	62.4	14.4
Southeast	89,390	1.9	15.0	76.9	6.2	82,265	0.5	12.6	80.3	6.6	33,134	...	9.7	83.0	7.3
West Gulf	50,953	6.9	17.5	61.4	14.2	45,861	3.0	16.0	65.6	15.4	12,549	...	7.0	73.5	19.5
South	183,266	2.9	18.7	68.5	9.9	167,028	1.1	16.2	72.2	10.5	69,060	...	13.8	74.3	11.9
North Rocky Mountain	29,066	3.0	69.4	19.0	8.6	7,352	0.8	36.9	58.5	3.8	2,847	...	35.0	59.2	5.8
South Rocky Mountain	15,782	...	72.3	8.5	19.2	2,957	...	16.3	43.6	40.1	1,498	...	12.9	60.5	26.6
Pacific Northwest	46,204	...	59.7	25.9	14.4	19,757	0.1	34.9	43.8	21.2	3,334	0.3	23.2	44.4	32.1
California	16,405	0.3	19.7	20.0	60.0	8,283	...	8.3	39.1	52.6	1,309	...	3.0	31.7	65.3
West	107,457	0.9	58.1	20.5	20.5	38,349	0.2	28.1	45.6	26.1	8,988	0.1	22.3	49.9	27.7
All regions	461,044	2.1	33.4	51.9	12.6	344,973	0.6	22.4	64.6	12.4	139,058	0.1	16.9	71.8	11.2
	Lumber company holdings					Pulp company holdings					Other non-farm holdings				
New England	2,349	...	49.6	49.3	1.1	6,285	...	97.4	2.6	...	14,183	0.1	59.3	36.8	3.8
Middle Atlantic	1,310	1.0	26.8	57.7	14.5	760	...	21.3	78.7	...	22,573	0.3	31.9	43.1	24.7
Lake States	1,634	...	28.5	71.5	...	1,564	...	17.0	59.8	23.2	11,917	0.1	20.6	50.0	29.3
Central States	217	...	4.6	95.4	...	...	...	...	...	...	15,764	...	4.7	93.0	2.3
Plains	15	...	33.3	66.7	...	...	...	...	...	...	15	...	66.7	33.3	...
North	5,525	0.2	36.1	59.8	3.9	8,609	...	76.1	19.7	4.2	64,452	0.1	29.2	55.2	15.5
South Atlantic	2,610	...	36.2	63.4	0.4	961	...	17.1	82.9	...	11,954	0.2	23.7	62.4	13.7
Southeast	5,959	1.5	18.1	78.1	2.3	2,491	4.1	64.0	31.9	...	40,681	0.5	11.0	81.4	7.1
West Gulf	7,688	14.1	32.8	50.5	2.6	1,923	14.7	58.7	26.6	...	23,701	...	11.9	69.5	18.6
South	16,257	7.2	28.0	62.7	2.1	5,375	7.2	53.7	39.1	...	76,336	0.3	13.2	74.7	11.8
North Rocky Mountain	3,527	1.7	30.4	64.7	3.2	...	...	...	...	...	978	...	65.7	34.3	...
South Rocky Mountain	1,093	...	19.7	23.0	57.3	4	...	...	...	100.0	362	...	20.7	35.6	43.7
Pacific Northwest	7,401	...	46.2	52.7	1.1	844	...	54.0	46.0	...	8,178	...	27.5	35.3	37.2
California	2,770	...	18.1	53.3	28.6	...	...	...	...	...	4,204	...	3.5	32.1	64.4
West	14,791	0.4	35.2	53.5	10.9	848	...	53.8	45.7	0.5	13,722	...	22.7	34.2	43.1
All regions	36,573	3.4	32.2	58.5	5.9	14,832	2.6	66.7	28.2	2.5	154,510	0.2	20.7	63.0	16.1
	Small private holdings (under 5,000 acres)					Medium private holdings (5,000 to 50,000 acres)					Large private holdings (over 50,000 acres)				
New England	17,661	...	44.5	51.9	3.6	2,150	0.8	82.2	11.9	5.1	9,483	...	95.5	4.5	...
Middle Atlantic	32,702	0.3	35.2	42.2	22.3	1,722	0.8	23.9	59.9	15.4	2,073	...	15.8	79.7	4.5
Lake States	24,545	0.2	16.8	60.6	22.4	1,260	...	23.8	62.9	13.3	3,240	...	34.1	61.2	4.7
Central States	40,068	...	4.1	92.9	3.0	1,185	...	36.9	63.1	...	517	...	5.0	95.0	...
Plains	2,990	1.5	25.3	73.2	...	...	...	...	...	...	...	...	...	...	...
North	117,966	0.2	21.9	65.5	12.4	6,317	0.5	46.1	44.8	8.6	15,313	...	68.7	29.7	1.6
South Atlantic	33,068	...	24.5	61.6	13.9	2,938	0.6	25.6	64.8	9.0	2,896	...	17.5	77.6	4.9
Southeast	58,227	...	8.7	83.3	8.0	13,799	...	16.9	78.5	4.6	10,239	3.9	28.9	65.5	1.7
West Gulf	30,771	...	10.5	69.6	19.9	4,766	...	15.4	70.8	13.8	10,324	13.2	32.7	51.4	2.7
South	122,066	...	13.4	74.0	12.6	21,503	0.1	17.7	74.9	7.3	23,459	7.5	29.2	60.8	2.5
North Rocky Mountain	3,868	...	33.3	61.3	5.4	318	...	24.2	54.1	21.7	3,166	1.8	42.6	55.6	...
South Rocky Mountain	1,766	...	18.3	28.6	53.1	838	...	7.6	73.3	19.1	353	...	27.2	47.9	24.9
Pacific Northwest	11,735	0.1	24.6	43.3	32.0	2,526	...	33.8	51.7	14.5	5,496	...	57.7	41.1	1.2
California	3,984	...	5.5	26.6	67.9	1,414	...	9.1	47.9	43.0	2,885	...	11.7	52.1	36.2
West	21,353	0.1	22.1	42.2	35.6	5,096	...	22.1	54.3	23.6	11,900	0.5	41.6	47.8	10.1
All regions	261,385	0.1	18.0	67.5	14.4	32,916	0.1	23.9	65.9	10.1	50,672	3.6	44.0	48.4	4.0
	National forests					Other federal holdings					State and local lands				
New England	822	1.7	97.4	...	0.9	69	...	18.8	...	81.2	666	3.2	80.5	2.8	13.5
Middle Atlantic	1,265	6.2	93.2	...	0.6	211	...	16.1	...	83.9	3,613	15.5	23.2	2.4	58.9
Lake States	5,455	42.9	57.1	...	...	1,040	19.9	71.2	6.7	2.2	14,805	...	56.8	42.6	0.6
Central States	1,951	...	99.0	1.0	...	166	...	69.9	0.6	29.5	326	...	88.0	10.8	1.2
Plains	30	53.3	46.7	...	...	302	...	...	100.0	...	4	...	...	100.0	...
North	9,523	25.7	73.9	0.2	0.2	1,788	11.6	50.5	20.8	17.1	19,414	3.0	51.9	33.2	11.9
South Atlantic	2,775	1.1	83.7	12.8	2.4	710	0.7	12.8	53.1	33.4	536	5.4	21.3	55.4	17.9
Southeast	3,802	26.9	61.7	11.4	...	2,107	12.3	13.8	69.0	4.9	1,216	1.5	36.0	62.4	0.1
West Gulf	3,561	60.8	39.2	...	...	1,123	1.1	12.7	81.3	4.9	408	1.5	6.6	61.8	30.1
South	10,138	31.7	59.9	7.7	0.7	3,940	7.0	13.3	69.7	10.0	2,160	2.5	26.8	60.5	10.2
North Rocky Mountain	18,061	4.5	87.5	1.7	6.3	1,951	...	53.5	8.3	38.2	1,702	...	36.0	43.6	20.4
South Rocky Mountain	10,765	...	88.8	...	11.2	1,680	...	66.8	...	33.2	380	...	66.6	15.5	17.9
Pacific Northwest	17,341	...	91.9	1.1	7.0	5,671	...	71.1	18.1	10.8	3,435	...	21.1	60.6	18.3
California	7,684	0.6	33.1	...	66.3	415	...	1.9	10.9	87.2	23	...	...	...	100.0
West	53,851	1.6	81.4	0.9	16.1	9,717	...	63.8	12.7	23.5	5,540	...	28.7	52.0	19.3
All regions	73,512	8.9	77.5	1.8	11.8	15,445	3.1	49.4	28.2	19.3	27,114	2.3	45.1	39.3	13.3

1/ In percent of commercial forest area
Intensive management - requires high order cutting and good fire protection
Extensive management - requires at least fair cutting and fair fire protection
Without management - implies that either the cutting practices or the fire protection, or both together, rate poor or worse
Non-operating area - areas not being operated for timber products.

Table 16. - Summary of the management status of commercial forest area in the United States, by type of private ownership - 1945

Owner	Intensive management	Extensive management	Below extensive management		All classes	Commercial forest area
			Protection and/or cutting of low grade	Non-operating area		
	Percent	Percent	Percent	Percent	Percent	Million acres
Private:						
Small	0.1	18.0	67.5	14.4	100.0	261.4
Medium	0.1	23.9	65.9	10.1	100.0	32.9
Large	3.6	44.0	48.4	4.0	100.0	50.7
Farm	0.1	16.9	71.8	11.2	100.0	139.1
Lumber	3.4	32.2	58.5	5.9	100.0	36.6
Pulp	2.6	66.7	28.2	2.5	100.0	14.8
Other	0.2	20.7	63.0	16.1	100.0	154.5
All private	0.6	22.4	64.6	12.4	100.0	345.0
Public	6.6	66.2	14.0	13.2	100.0	116.0
All owners	2.1	33.4	51.9	12.6	100.0	461.0

Table 17. - Summary of the management status of national-forest commercial forest area, by sections of the United States - 1945

Sections	All commercial forest area	National Forests					
		Commercial forest area	Percent of all commercial forest area	Intensive management	Extensive management	Below extensive management 1/	All classes
	Million acres	Million acres	Percent	- Percent of National Forest commercial forest area -			
North	170.3	9.5	5.6	25.7	73.9	0.4	100.0
South	183.3	10.1	5.5	31.7	59.9	8.4	100.0
West	107.4	53.9	50.1	1.6	81.4	17.0	100.0
United States	461.0	73.5	15.9	8.9	77.5	13.6	100.0

1/ Mostly nonoperating areas of working circles where cutting has not yet been possible or desirable.

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